WHAT IS CLAIMED IS:

1. A method for manufacturing a MOS varactor, comprising the steps of:

forming a device isolation film on a semiconductor substrate;

depositing a gate oxide film and a first polysilicon after the formation of the device isolation film;

patterning the resultant material and etching the first polysilicon and the gate oxide film to form a transistor gate;

coating the entire resultant material with a photoresist film, then opening a varactor forming region and then forming a varactor oxide film of a high dielectric material;

depositing the second polysilicon and then patterning the same to form a varactor gate; and

removing the photoersist film of the transistor forming region and then proceeding to the following process.

2. A method for manufacturing a MOS varactor, comprising the steps of:

forming a device isolation film on a semiconductor substrate;

5   forming a varactor oxide film of a high dielectric material over the entire surface of the resultant material and then removing the regions except for the varactor to pattern the same;

depositing a gate oxide film and a polysilicon on the entire

10   surface of the resultant material and implanting ions in accordance with an MOS type; and

patterning the polysilicon by a mask, patterning the transistor gate and the varactor gate and then proceeding to the following process.

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3. The method of claim 1, wherein the varactor oxide film is selected from the group consisting of Al_2O_3, Ta_2O_5, HfO_2, ZrO_2, HfON, BST and TiO_2.

20   4. The method of claim 1, wherein the varactor oxide film is deposited at less than 400°C by a deposition technique selected from the group consisting of ALD, PEALD and MOCVD.

5.   The method of claim 2, wherein the varactor oxide film is selected from the group consisting of Al_2O_3, Ta_2O_5, HfO_2, ZrO_2, HfON, BST and TiO_2.

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6.   The method of claim 2, wherein the varactor oxide film is deposited at less than 400°C by a deposition technique selected from the group consisting of ALD, PEALD and MOCVD.